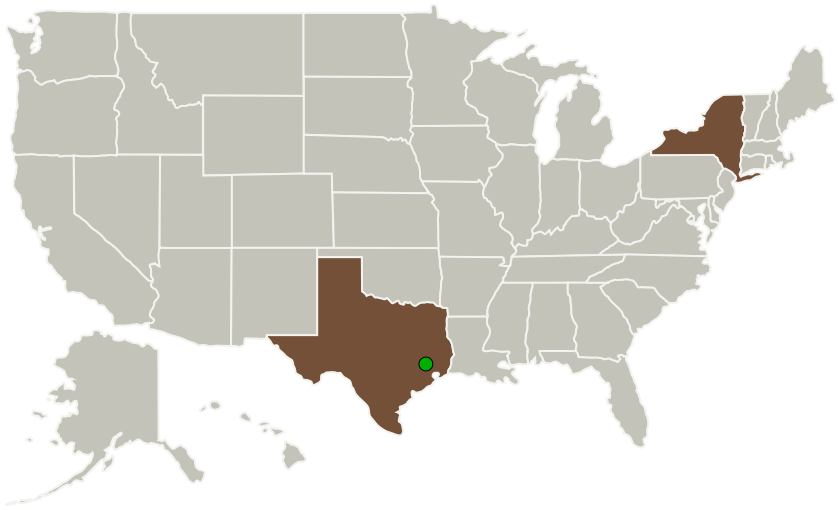
Planetary Volatiles Extractor for In Situ Resource Utilization, Phase I

Completed Technology Project (2015 - 2015)

Project Introduction

Under previous SBIR Phase 1, we demonstrated MISME system to TRL 3. This system can be used on Mars, the Moon, as well as Asteroids (a Spider concept with self- anchoring approach was developed). We propose to focus this Phase I on the two approaches of water extraction: Sniffer and Corer. At the end of the Phase 1, we will trade all 3: Sniffer, Corer, MISME and select one for further development in Phase 2. After the Sniffer and the Corer tests, a trade study will be conducted to compare Sniffer vs Corer vs MISME approaches. The trade study will include figure of merits (e.g. extraction efficiency etc), potential for scaling production up, easy of deploying on more than one planetary body, as well as mission implementation challenges and risks. During this time we will also work closely with our COTR to determine mission preferences. The end result will be selection of the best approach. During this trade study we will also consider different properties of planetary regoliths as well as environmental conditions that would affect excavation and processing (e.g. poorly sorted particle size distribution and agglutinates on the Moon which make regolith very cohesive, perchlorates and clays on Mars which make soil very sticky etc).

Primary U.S. Work Locations and Key Partners



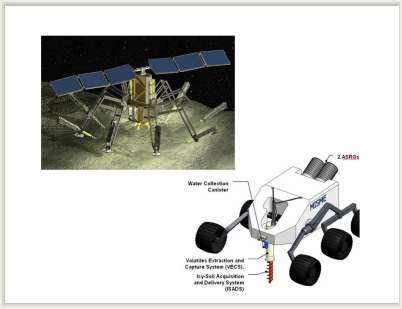


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Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Honeybee Robotics, Ltd.	Lead Organization	Industry	Pasadena, California
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
New York	Texas

Project Transitions

June 2015: Project Start

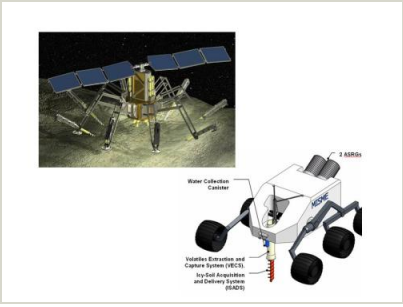
December 2015: Closed out

Closeout Summary: Planetary Volatiles Extractor for In Situ Resource Utilization, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/139221)*

Images



Briefing Chart Image
Planetary Volatiles Extractor for In Situ Resource Utilization, Phase I *(https://techport.nasa.gov/image/136712)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Honeybee Robotics, Ltd.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Kris Zacny

Co-Investigator:
Kris Zacny

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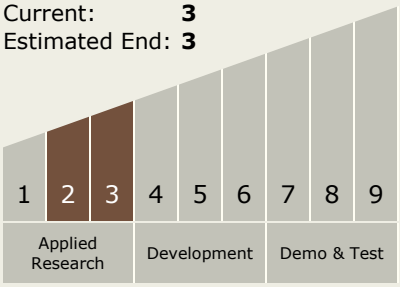
Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.1 In-Situ Resource Utilization
    - TX07.1.2 Resource Acquisition, Isolation, and Preparation

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System